

TC74HC573AP,TC74HC573AF,TC74HC573AFW

Octal D-Type Latch with 3-State Output

The TC74HC573A is a high speed CMOS OCTAL LATCH with 3-STATE OUTPUT fabricated with silicon gate C²MOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

Its 8-bit D-type latche is controlled by a latch enable input (LE) and a output enable input (\overline{OE}).

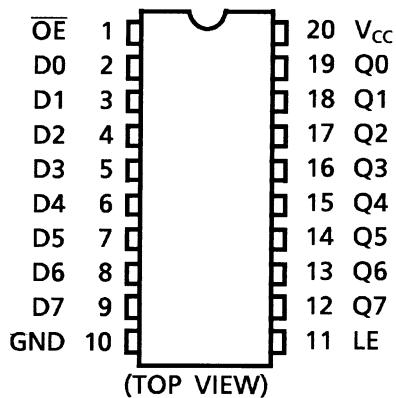
When the \overline{OE} input is high, the eight outputs are in a high impedance state.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

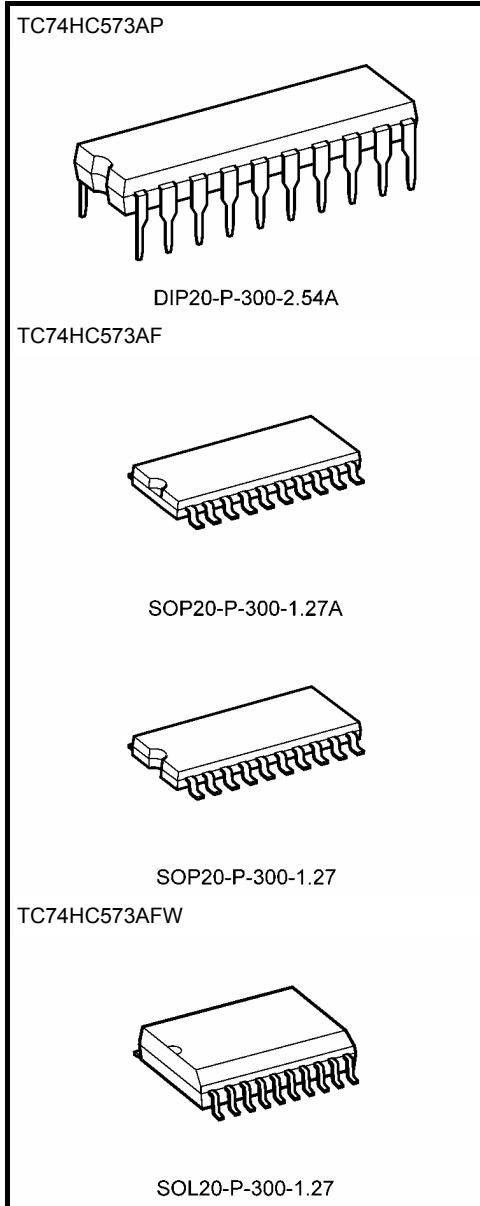
Features

- High speed: $t_{pd} = 13$ ns (typ.) at $V_{CC} = 5$ V
- Low power dissipation: $I_{CC} = 4 \mu A$ (max) at $T_a = 25^\circ C$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\%$ V_{CC} (min)
- Output drive capability: 15 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 6$ mA (min)
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: V_{CC} (opr) = 2 to 6 V
- Pin and function compatible with 74LS573

Pin Assignment

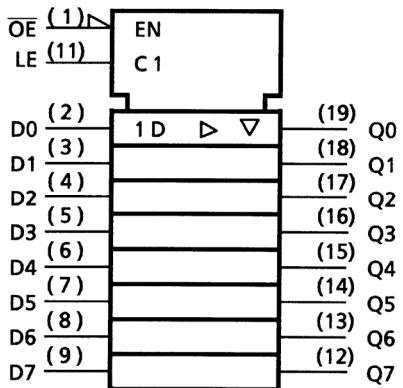


Note: xxxFW (JEDEC SOP) is not available in Japan.



Weight

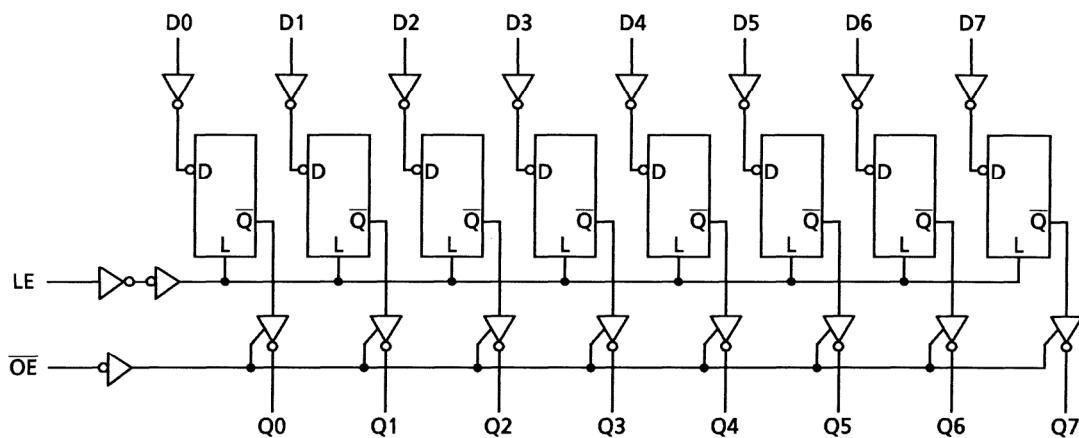
DIP20-P-300-2.54A	: 1.30 g (typ.)
SOP20-P-300-1.27A	: 0.22 g (typ.)
SOP20-P-300-1.27	: 0.22 g (typ.)
SOL20-P-300-1.27	: 0.46 g (typ.)

IEC Logic Symbol**Truth Table**

Inputs			Output
\overline{OE}	LE	D	Q
H	X	X	HZ
L	L	X	Q_n
L	H	L	L
L	H	H	H

X: Don't care

HZ: High impedance

 Q_n : Q outputs are latched at the time when the LE input is taken to a low logic level.**System Diagram**

Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	–0.5 to 7	V
DC input voltage	V_{IN}	–0.5 to $V_{CC} + 0.5$	V
DC output voltage	V_{OUT}	–0.5 to $V_{CC} + 0.5$	V
Input diode current	I_{IK}	± 20	mA
Output diode current	I_{OK}	± 20	mA
DC output current	I_{OUT}	± 35	mA
DC V_{CC} /ground current	I_{CC}	± 75	mA
Power dissipation	P_D	500 (DIP) (Note 2)/180 (SOP)	mW
Storage temperature	T_{STG}	–65 to 150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Note 2: 500 mW in the range of $T_a = -40$ to 65°C . From $T_a = 65$ to 85°C a derating factor of $-10 \text{ mW/}^\circ\text{C}$ shall be applied until 300 mW.

Recommended Operating Conditions (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2 to 6	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature	T_{OPR}	–40 to 85	°C
Input rise and fall time	t_r, t_f	0 to 1000 ($V_{CC} = 2.0 \text{ V}$) 0 to 500 ($V_{CC} = 4.5 \text{ V}$) 0 to 400 ($V_{CC} = 6.0 \text{ V}$)	ns

Note: The recommended operating conditions are required to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit	
				V _{CC} (V)	Min	Typ.	Max	Min		
High-level input voltage	V _{IH}	—		2.0	1.50	—	—	1.50	—	V
				4.5	3.15	—	—	3.15	—	
				6.0	4.20	—	—	4.20	—	
Low-level input voltage	V _{IL}	—		2.0	—	—	0.50	—	0.50	V
				4.5	—	—	1.35	—	1.35	
				6.0	—	—	1.80	—	1.80	
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 µA	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20 µA	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
				6.0	—	0.0	0.1	—	0.1	
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND		2.0	—	—	—	—	—	µA
				4.5	—	—	—	—	—	
				6.0	—	—	—	—	—	
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND		2.0	—	—	—	—	—	µA
Quiescent supply current	I _{CC}	V _{IN} = V _{CC} or GND		2.0	—	—	—	—	—	µA

Timing Requirements (input: t_r = t_f = 6 ns)

Characteristics	Symbol	Test Condition		Ta = 25°C		Ta = -40 to 85°C		Unit
				V _{CC} (V)	Typ.	Limit	Limit	
Minimum pulse width (LE)	t _W (H)	—		2.0	—	75	95	ns
				4.5	—	15	19	
				6.0	—	13	16	
Minimum set-up time (data)	t _s	—		2.0	—	50	65	ns
				4.5	—	10	13	
				6.0	—	9	11	
Minimum hold time (data)	t _h	—		2.0	—	5	5	ns
				4.5	—	5	5	
				6.0	—	5	5	

AC Characteristics (input: $t_r = t_f = 6$ ns)

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = -40 to 85°C		Unit	
		CL (pF)	V _{CC} (V)	Min	Typ.	Max	Min	Max			
Output transition time	t_{TLH} t_{THL}	—	50	2.0	—	20	60	—	75	ns	
				4.5	—	6	12	—	15		
				6.0	—	5	10	—	13		
Propagation delay time (LE-Q)	t_{pLH}	—	50	2.0	—	50	115	—	145	ns	
				4.5	—	15	23	—	29		
				6.0	—	13	20	—	25		
	t_{pHL}		150	2.0	—	60	155	—	195		
				4.5	—	20	31	—	39		
				6.0	—	17	26	—	33		
Propagation delay time (D-Q)	t_{pLH}	—	50	2.0	—	42	110	—	140	ns	
				4.5	—	14	22	—	28		
				6.0	—	12	19	—	24		
	t_{pHL}		150	2.0	—	57	150	—	190		
				4.5	—	19	30	—	38		
				6.0	—	16	26	—	32		
Output enable time	t_{pZL}	$R_L = 1\text{ k}\Omega$	50	2.0	—	55	140	—	175	ns	
				4.5	—	17	28	—	35		
				6.0	—	14	24	—	30		
	t_{pZH}		150	2.0	—	66	180	—	225		
				4.5	—	22	36	—	45		
				6.0	—	19	31	—	38		
Output disable time	t_{pLZ} t_{pHZ}	$R_L = 1\text{ k}\Omega$	50	2.0	—	40	125	—	155	ns	
				4.5	—	17	25	—	31		
				6.0	—	15	21	—	26		
Input capacitance	C_{IN}	—			—	5	10	—	10	pF	
Output capacitance	C_{OUT}	—			—	10	—	—	—	pF	
Power dissipation capacitance	C_{PD} (Note)	—			—	51	—	—	—	pF	

Note: CPD is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8 \text{ (per latch)}$$

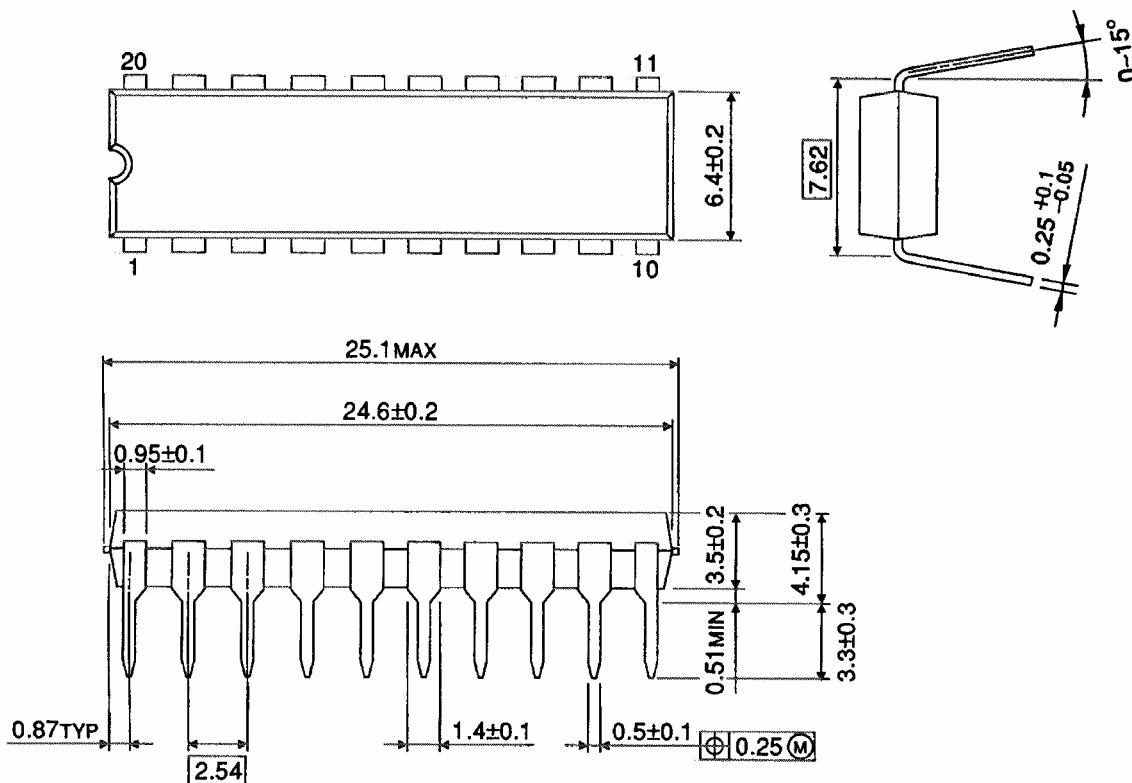
And the total CPD when n pcs. of latch operate can be gained by the following equation:

$$C_{PD}(\text{total}) = 33 + 18 \cdot n$$

Package Dimensions

DIP20-P-300-2.54A

Unit : mm

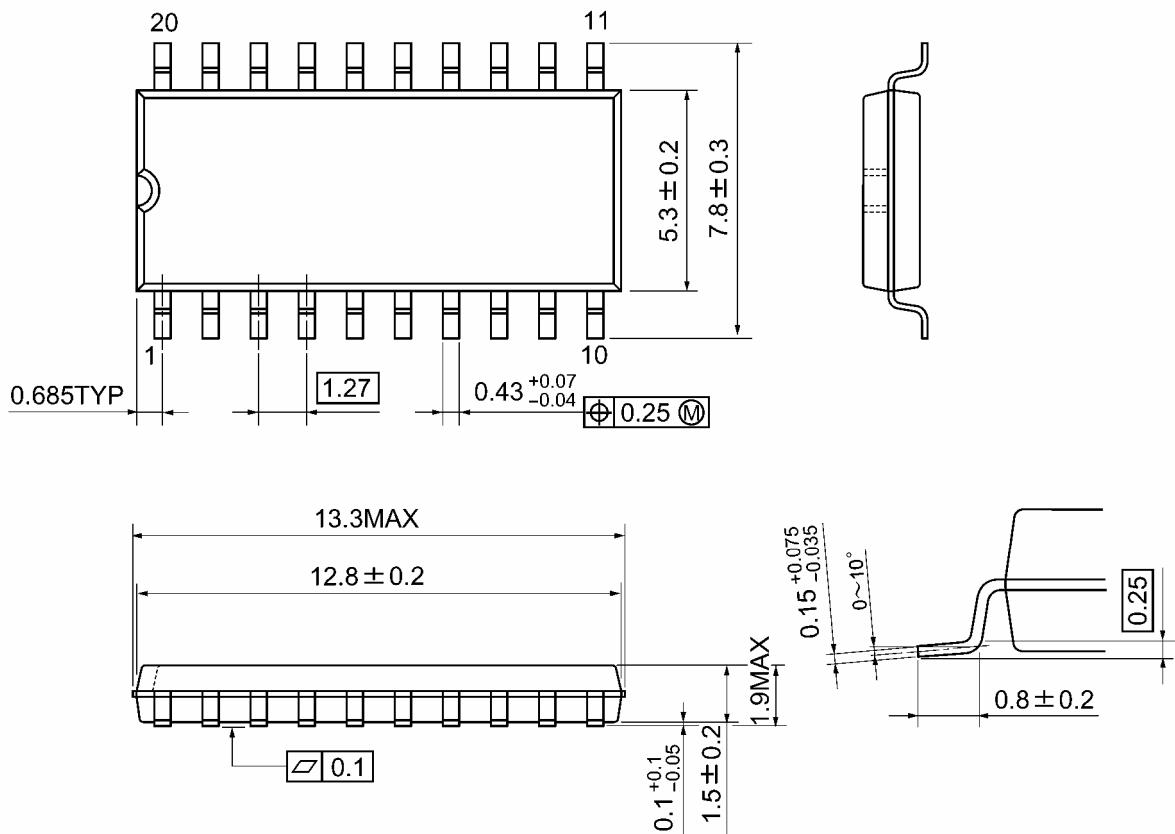


Weight: 1.30 g (typ.)

Package Dimensions

SOP20-P-300-1.27A

Unit: mm

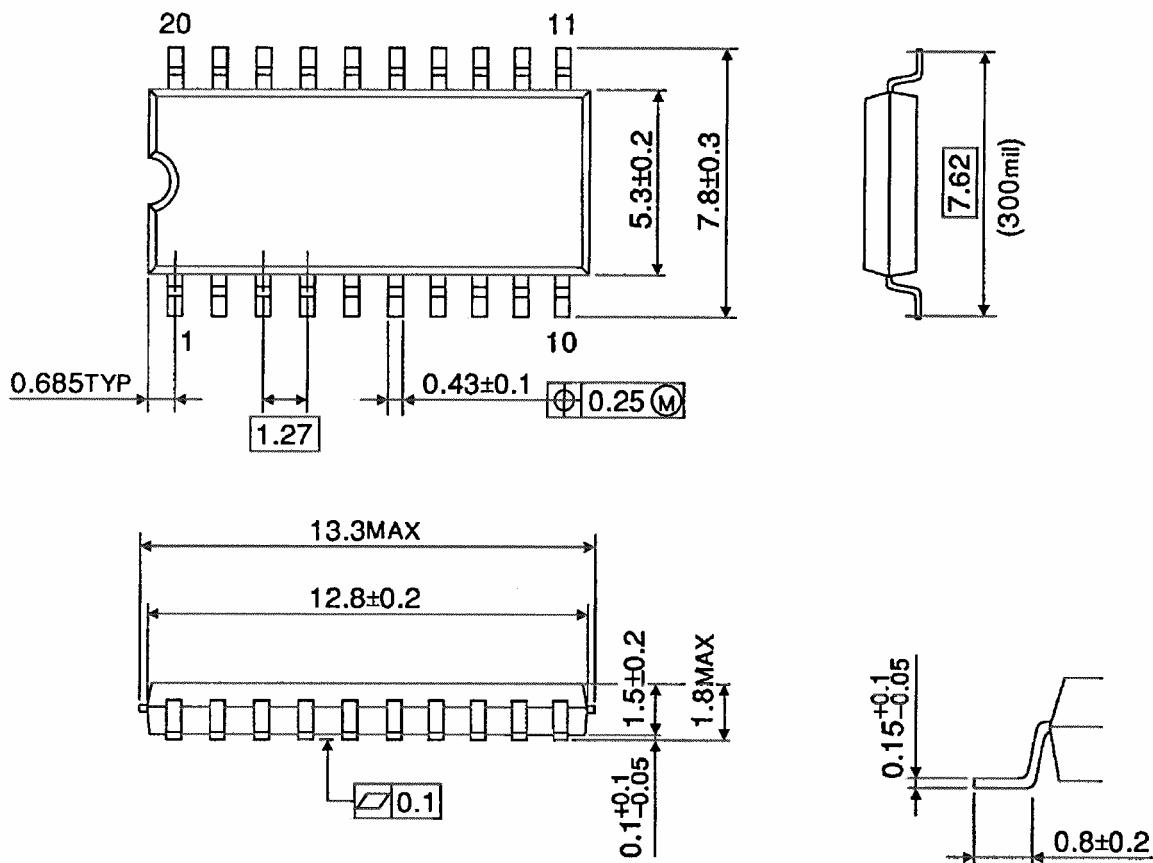


Weight: 0.22 g (typ.)

Package Dimensions

SOP20-P-300-1.27

Unit : mm

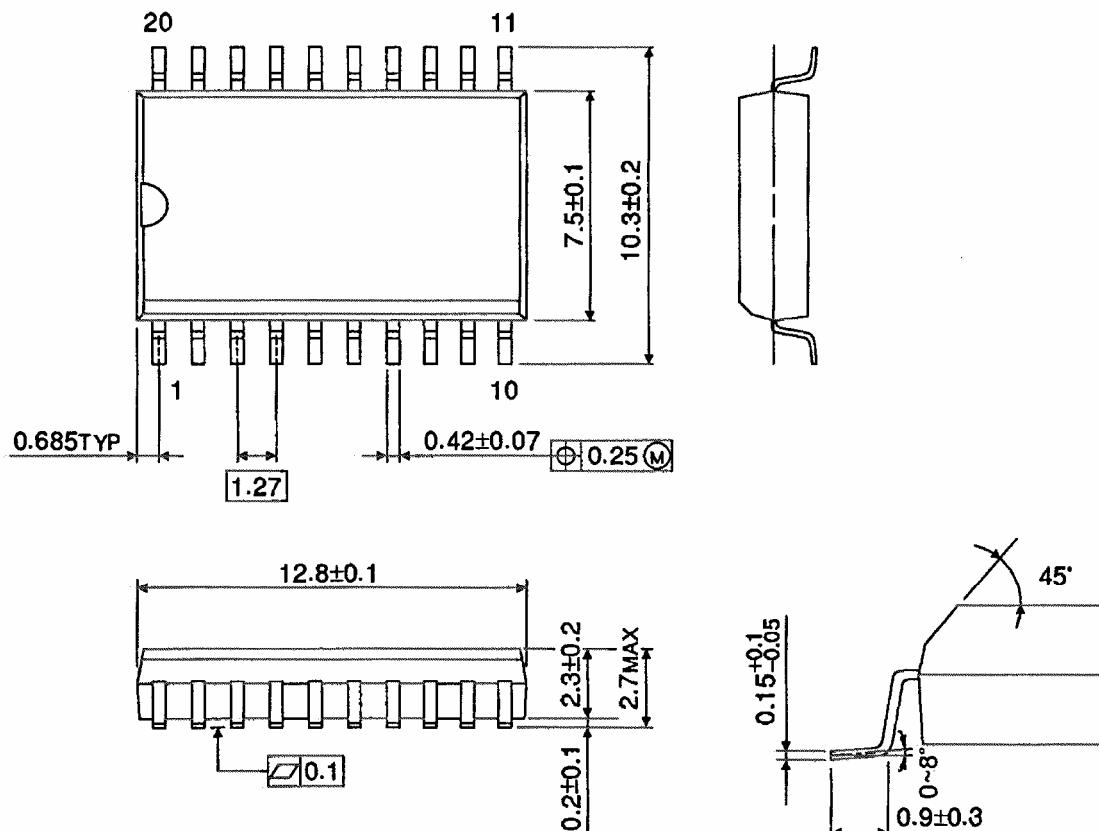


Weight: 0.22 g (typ.)

Package Dimensions (Note)

SOL20-P-300-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.46 g (typ.)

Note: Lead (Pb)-Free Packages
DIP20-P-300-2.54A SOP20-P-300-1.27A

RESTRICTIONS ON PRODUCT USE

20070701-EN

- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document shall not be used or embedded to any downstream products of which manufacture, use and/or sale are prohibited under any applicable laws and regulations.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or the third parties.
- Please contact your sales representative for product-by-product details in this document regarding RoHS compatibility. Please use these products in this document in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances. Toshiba assumes no liability for damage or losses occurring as a result of noncompliance with applicable laws and regulations.